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SUBJECT: NICARAGUA: EMBASSY SCIENCE FELLOWS PROGRAM

REF: STATE 28712

¶1. (U) In response to reftel, Embassy Managua submits two proposals for the Embassy Science Fellows Program 2008: (i) The Nicaraguan National

PROPOSAL I: UNAN BIOTECHNOLOGY LAB

¶2. (U) The Nicaraguan National Autonomous University (UNAN) - Managua, Food Technology Laboratory conducts research activities in the areas of the molecular characterization of national cacao criollo and hybrid germplasms (microsatellite); micropropagation of timber-yielding trees, such as teak and mahogany; and the detection of Genetically Modified Organisms (GMO-biovigilance program).

¶3. (U) In addition to its work in micropropagation, microsatellite, and GMOs, the Food Technology Laboratory supports research in the molecular characterization of Phitaya (dragon fruit) using RFLP; the bioprospection of cellulasa in the Bosawas Natural Reserve of remote northern Nicaragua; and the identification and isolation of fungus cellulasa (ligno-cellulose degradation) used in the production of bioenergy. Dr. Ivan Marin is the Director of the Food Technology Laboratory.

Proposed Activities

¶4. (U) UNAN's primary request for assistance is to characterize the molecular markers of the native Nicaraguan cacao germplasm through the application of Simple Sequence Repeats (SSR) microsatellite molecular DNA markers. The laboratory hopes to identify the native cacao tree with the best genetic potential. Technically, the techniques of molecular characterization germplasm (molecular markers) include the extraction and quantification of plant DNA; molecular marker applications - Random Amplified Polymorphic DNA (RDPS), Amplified Fragment Length Polymorphisms (AFLP) and SSR microsatellite; the assembly and running of Vertical Polyacrylamid Gel and Silver Stain; and the genetic interpretation of the obtained results using statistical programs such as Arlequin or Structure.

¶5. (U) The germplasms of various endogenous vegetative resources, such as cacao, dragon fruit, avocado, corn and beans, require the protection of their DNA characteristics. Researchers can then identify regions of the genome for disease tolerance, stress resistance, growth rate and yield. Utilizing this methodology, the lab identified the peanut Mottle Potyvirus in Nicaragua, eventually eliminating the expensive import of foreign peanut seeds.

¶6. (U) The Fellow would also work on the micropropagation of tissue culture involving the elaboration of tissue culture media (component and concentration). This would require knowledge in growth regulating phytohormone applications; and Asepsis antibiotics use and pathogen contamination control.

¶7. (U) In addition, the Fellow would provide assistance in GMO seed, grain, or plant detection, requiring knowledge in the methods of said detection, such as PCR and ELISA.

¶8. (U) Secondary activities might include teaching the subject of Biotechnology to undergraduates, numbering 60 students per year; participating in the UNAN Bioscience Forum, an event held two or three times per year focusing on the development and diffusion biotechnology applications; and advising the biotechnology documentation center on how to organize itself.

Installed Laboratory Equipment

¶9. (U) Current laboratory equipment consists of:
a) Greenhouse;
b) Tissue Culture Room;
c) Autoclave;
d) PCR (Eppendorf);
e) Horizontal and Vertical Gel Electrophoresis;
f) Ethidium bromide stain;
g) Phenol - Chloroform DNA extraction;
h) Distillated water;
i) Refrigerated centrifuge (Eppendorf); and
j) Ph-Meter and precision balance.

Required Skills

¶10. (U) Substantive knowledge and practical experience in agrobiotechnology; Spanish language fluency.

Preferred Time Frame

¶11. (U) Three months between May to November 2008 requiring a medical clearance (no security clearance is required).

Background

¶12. (U) The Nicaraguan population, including the media and legislators, has limited understanding of biotechnology products. Generally, consumers associate biotechnology exclusively to GMOs. The lack of information reduces the level of acceptance of biotechnology products among consumers.

¶13. (U) Nicaragua does not produce any biotechnology crops. It does not have the technical resources to develop them for commercial purposes and has not imported biotechnology seeds for planting.

Nicaragua is a large food aid recipient due to its limited capacity to supply food for human and animal consumption. Yellow corn for animal feed is the only biotechnology crop imported from the United States. Imports of other biotechnology products from other countries are limited or non-existent.

¶14. (U) To date, Nicaragua's regulatory approach to biotech has been essentially science-based. Nicaragua is a signatory of the Cartagena Protocol on Biosafety, under which the government began in 2005 to require notifications of imports of living modified organisms (LMO) and risk analyses for such imports. At present, there is no labeling regulation for food or feed containing GMOs.

¶15. (U) A commission on Risk Analysis for GMOs (CONARGEN), composed of government officials and academics, conducts these risk analyses, and t

¶16. (U) At present, yellow corn for animal feed is the only biotechnology commodity that has been subjected to risk analysis. Risk analyses for human food use have not been requested. Legislation allows for field-testing of biotechnology crops after the required risk analysis, but field trials of a biotech crop have never been conducted.

¶17. (U) CONARGEN does not have the technical capability to test whether a product is transgenic or not, but its members are inclined to base t

PROPOSAL II: UNAN LEPTOSPIROSIS EPIDEMIOLOGY RESEARCH

¶18. (U) The Fellow will be working with the national Ministries of Agriculture and Forestry (MAGFOR), Health (MINSA) and the Nicaraguan Natior

Proposed Activities

¶19. (U) The Fellow will help local scientists to determine the zoonotic epidemiology of leptospirosis in domestic animals/livestock, and to isolate and characterize the leptospira organism in an attempt to break the cycle. The Fellow will work with UNAN-Leon, MINSA, and MAGFOR on protocols to improve surveillance and diagnostics. All diagnoses so far have been via serology. No one in Nicaragua has isolated the organism from a suspected case in the last 15 years. Isolating and characterizing the organism may require the Fellow to return to the U.S. with samples.

¶20. (U) Systematic surveillance, an improved understanding of the epidemiology of leptospirosis, and improvement in the capacity to diagnose leptospirosis are necessary for development of strategies for the prevention and control of leptospirosis outbreaks. Improving the understanding of the distribution and epidemiology of leptospirosis in the region targeted for this proposal will lead to establishment of the most effective methods to control the disease and prevent outbreaks in the region. Such methods may also be applicable to other Central American countries at risk for leptospirosis outbreaks.

Required Skills

¶21. (U) Veterinarian and zoonotic disease specialist, with emphasis in microbiology and experience extraction methods of DNA from bacteria for polymerase chain reaction; and Spanish language fluency.

Preferred Time Frame

¶22. (U) Three months between May to November 2008 requiring a medical clearance (no security clearance is required).

Background

¶23. (U) Leptospirosis is recognized as an emerging infectious disease with recent large outbreaks reported from many locations throughout the world. The incidence of infection is significantly higher in warm climates compared to temperate regions. Infection in humans is primarily acquired through direct or indirect contact with the urine of infected animals, most commonly through occupational or recreational exposure to urine-contaminated surface water. Animals can serve as maintenance hosts and remain chronically infected, and contaminate the environment with leptospires shed in their urine. A variety of different animals, including rodents and wild and domestic animals, serve as maintenance hosts for the different leptospira serovars, and certain serovars are commonly associated with specific maintenance hosts.

¶24. (U) Nicaragua continues to have endemic cases of leptospirosis. Domestic animals and livestock are considered to maintain the endemic state of the disease in various communities.

¶25. (U) In 1995, the Centers for Disease Control (CDC) collected serum samples from cattle, horses, pigs, and dogs in the Department of Leon. In northern Leon, 76% of the horses, 35% of the pigs, 50% of the dogs, and 59% of the cattle were sero positive. In the local abattoir of Leon, 67% of the cattle were sero positive. During the outbreak of February 2007, in the community of Leona, the sero prevalence in domestic animals was 27%. At that time all goats and sheep tested were negative. During an outbreak in October/November of 2007, 34% of the animals tested had a titer greater than 1:400. The serovars identified were similar to those found in previous studies. Previous experience in the post-disaster setting in Nicaragua has demonstrated different risk factors and sources of leptospiral contamination.

¶26. (U) Similar outbreaks of leptospirosis have occurred in other Latin American countries. Strategies for prevention and control of outbreaks

¶27. (U) To date, all attempts to culture and isolate the organism have failed. The results so far demonstrate the need for improved surveillance, control and diagnosis of leptospirosis in domestic livestock and to better understand the zoonotic epidemiology of the disease. Prevention of leptospirosis is dependent upon an understanding of the local epidemiology of the disease, locally important serovars, and associated animal hosts.

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